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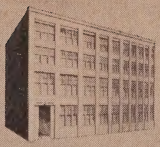

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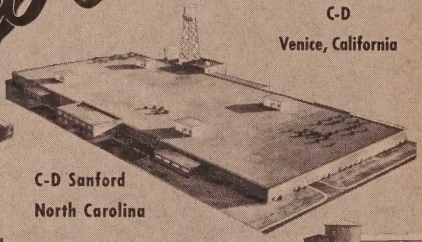
C-D
Venice, California



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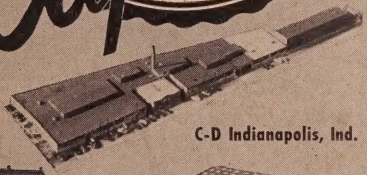
North Carolina



C-D Indianapolis, Ind.

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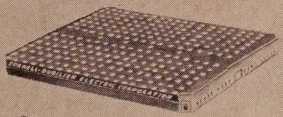

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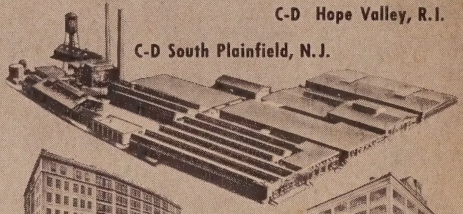

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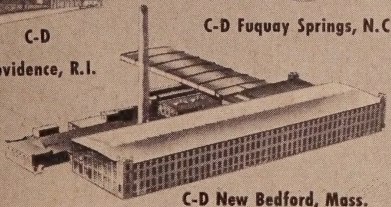

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Vol. 22 OCTOBER, 1957 No. 10

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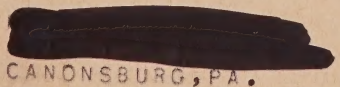

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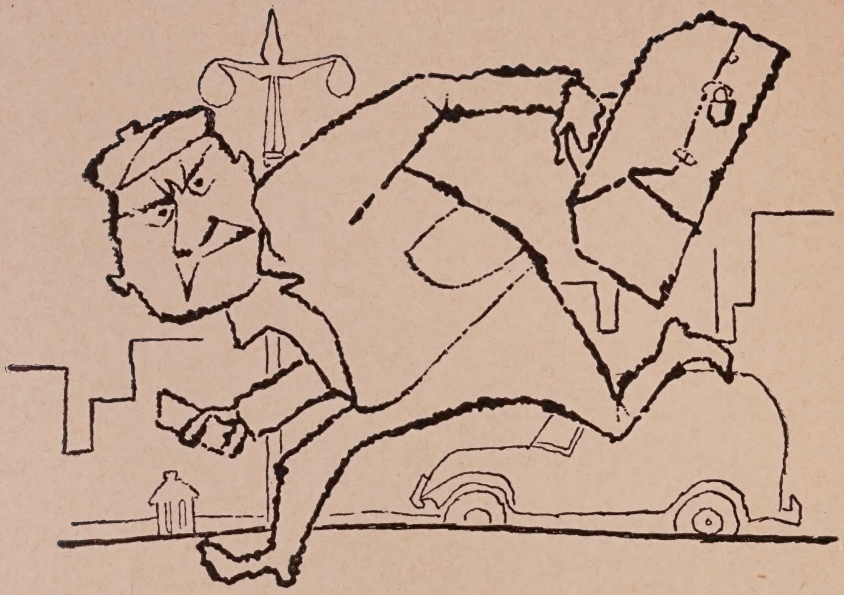

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ELECTRONIC LOAD RESISTOR WITH POWER TRANSISTORS

Power supplies, batteries, generators, and other d-c sources must be tested to determine their output capability and voltage regulation. For all-around applications of this sort, a variable load resistor is employed. Generally, a d-c ammeter is connected in series with the resistor, and the resistance value is adjusted for rated load-current flow. This simple arrangement is shown in Figure 3.

The resistor method has several inconveniences: (1) Power-type resistors which are required in the test usually are not easy to vary in a smooth manner. (2) When a power rheostat is employed for smooth variation, this component often is ungainly in size and its resolution not as good as desired. (3) Heat is not readily conducted away from the resistor except by excellent ventilating means. (4) There is a common tendency toward slovenly bench-top setups for this type of test.

The electronic "load resistor" overcame the evident disadvantages of the conventional load resistor. In the electronic scheme, the internal plate-cathode resistance of a vacuum tube is

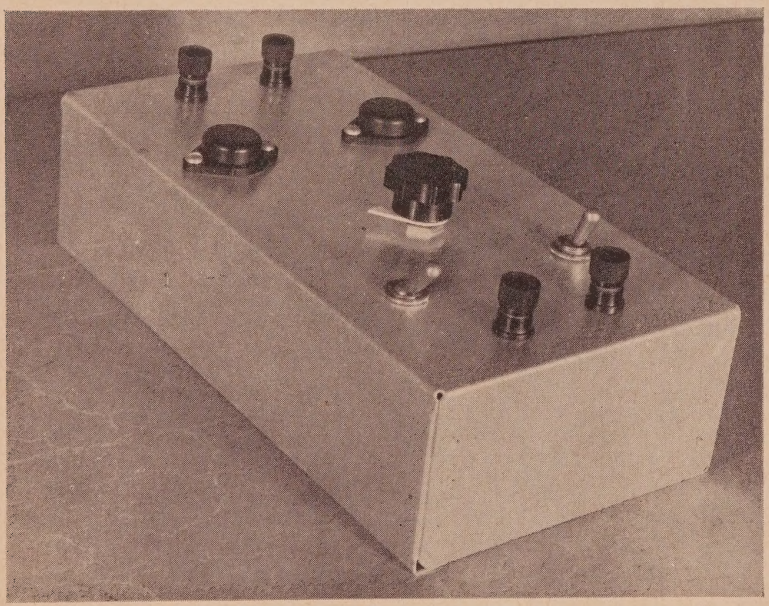

Fig. 1. Completed Electronic Load Resistor.
Compare with Figure 8 for identification of the components seen in the above photograph.

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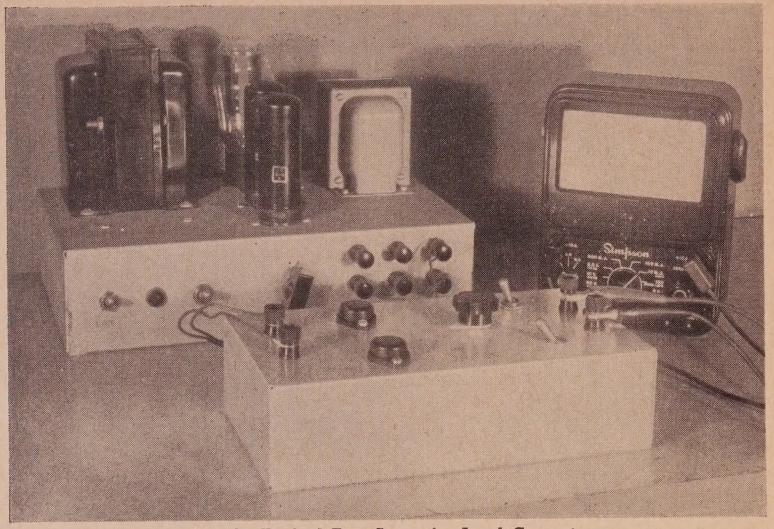

Fig. 2. Typical Test Setup for Load Current.
Here, the electronic load resistor is connected to an external meter and to the output terminals of the high-current, 6-volt d-c section of a laboratory-type power supply.

employed as the load resistance, and its ohmic value is varied by adjusting the grid bias voltage of the tube. A small-sized, light-duty potentiometer may be used for the bias variation, since little current is involved. Extremely smooth variation of the plate resistance is obtained, as a result of the superior resolution of the low-powered potentiometer.

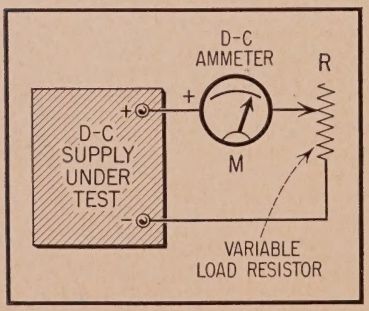

Fig. 3. Load Test of D-C Supply.

Figure 4 illustrates the principle of the electronic load resistor. In this circuit, triode V is the **load tube** or **resistor tube.** Grid bias voltage is supplied by batteries B_1 and B_2 through potentiometer R. When the wiper of this potentiometer is at its extreme left position, the bias voltage is at its maximum negative value; and when the wiper is at its extreme right position, the bias has its maximum positive value. With the wiper at the midpoint of the resistance winding, the bias voltage is zero. This arrangement permits smooth variation of the bias voltage between the limits required for plate current cutoff and plate current saturation. Maximum plate current flows when the grid voltage is maximum positive; minimum or zero current when the grid is maximum negative.

The plate of tube V is connected to the positive output terminal of the d-c supply under test through milliammeter M. Plate current, which is

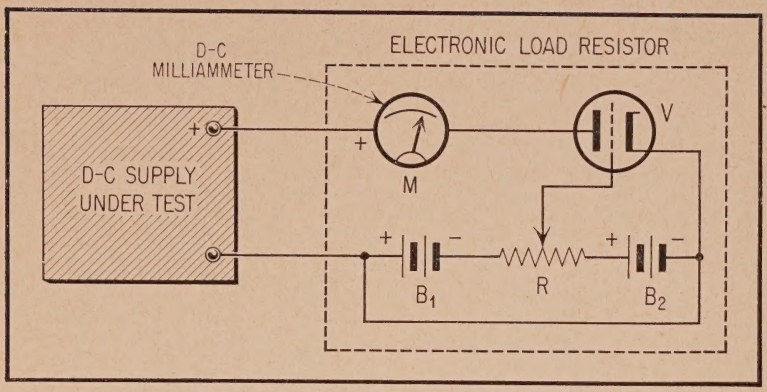

Fig. 4. Principle of Electronic Load Resistor.

the load current of the supply, is indicated by meter M and may be set to any desired value between zero (cutoff) and the maximum value permissible with the particular tube used (saturation) if this value does not cause the allowable plate dissipation to be exceeded, by adjustment of potentiometer R.

Since the tube plate must dissipate the full d-c load power, the maximum permissible current which can flow through the electronic load resistor must not exceed (1) the maximum recommended plate current of the tube, nor (2) the current value which at the supply-voltage level corresponds to a d-c plate power equal to the maximum permissible plate dissipation. Thus, the maximum load current value $I = P_d/E$; where E is the supply voltage (in volts), I the maximum permissible load current (in amperes), and P_d the maximum permissible plate dissipation of the tube (in watts). Furthermore, I must not exceed I_{pm} which is the maximum permissible d-c plate current of the tube.

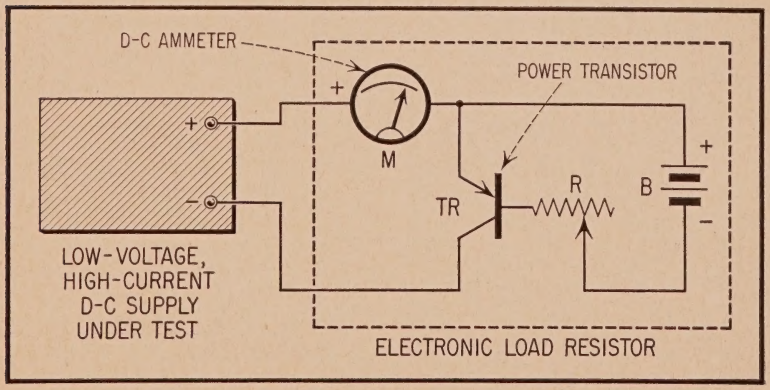

Fig. 5. Principle of Transistorized Electronic Load Resistor.

The load current is limited to milliamperes, except when a large transmitting-type tube is employed. It is common practice in small-sized electronic load resistors to connect several tubes in parallel to obtain higher current-handling capacity.

The tube-type electronic load resistor will not handle currents of several amperes unless unreasonably large tubes are employed in parallel. Its operation is best at the higher d-c voltages common for tube plates, and the device is not generally applicable where potentials under about 50 v are encountered. Moreover, filament-heating power is required.

Transistorization of Circuit

The power transistor is invaluable for use in low-voltage, high-current electronic load resistors. This is evident from the fact that the transistor essentially is a low-voltage device, the maximum collector current is rated in amperes rather than milliamperes, there is no filament to heat, and a single bias battery is sufficient.

Figure 5 illustrates the principle of the transistorized device. Here, the load current is the collector current of the power transistor, TR, and is indicated by d-c ammeter M. The collector-to-emitter resistance, and accordingly the load current, is varied by adjusting the base current by means of rheostat R. The base current is supplied by the single, low-voltage battery B.

The controlling base current (I_b) is a small fraction of the load (collector) current, I_c. This current $I_b = I_c/B$; where I_b is the base current (in amperes), I_c the collector or load current (in amperes), and B the base-to-collector current amplification factor (beta) of the transistor. Beta for power transistors is between 30 and 50, which is to say that the control current will be of the order of 20 ma per ampere of collector current.

The maximum load current which may be passed through the transistor-type electronic load resistor must not exceed the maximum permissible steady-state d-c collector current of the transistor. Nor must it exceed the current value which at the supply-voltage level produces a d-c collector power equal to the maximum permissible collector dissipation. Thus, the maximum current value $I = P_d/E$; where E is the supply voltage (in volts), I the current (in amperes),

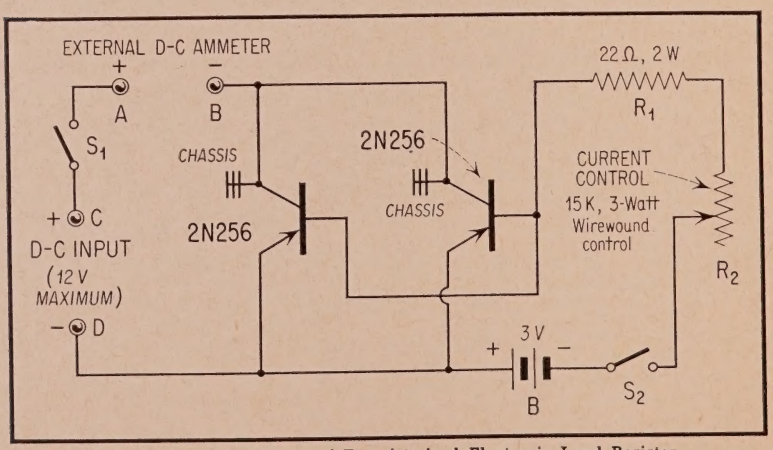

Fig. 6. Complete Circuit of Transistorized Electronic Load Resistor.

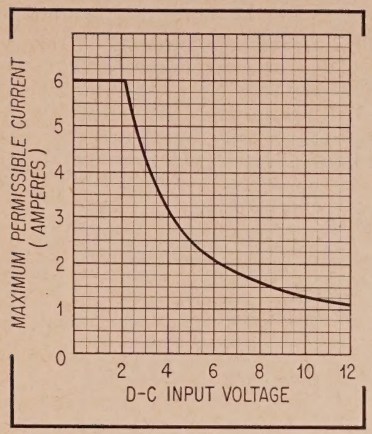

Fig. 7. Operating Limits of Instrument.

and P_d the maximum permissible collector dissipation of the transistor (in watts). It will be noted from the transistor ratings that the allowable dissipation is considerably higher when a heat sink is employed than when the transistor is merely operated in free air.

When it is desired to accommodate load currents in excess of the maximum permissible collector current rating of the transistor, several transistors may be connected in parallel in the electronic load resistor circuit. Thus, the allowable load current may be doubled by paralleling two transistors, tripled with three transistors, etc. However, it must be remembered that the required control (base) current also is multipled by the same factor (i. e., doubled, tripled, etc.). For example, a base current of 20 ma might produce a collector current flow of 1 ampere in a single transistor. Two such transistors in parallel would increase the load current to 2 amperes at the same applied voltage but would require a base current of 40 ma.

Transistorized Circuit

Figure 6 shows the complete circuit schematic of a practical electronic load resistor employing two CBS Type 2N256 power transistors connected in parallel. Load-current control is obtained by adjustment of rheostat R_2 which varies the base current. This current is supplied by the self-contained 3-volt battery, B.

The maximum current which can be handled by this circuit is 6 amperes which is twice the maximum permissible steady-state d-c collector current of a single 2N256 transistor. The maximum d-c voltage which may be applied is 12 v, the maximum permissible d-c collector voltage under steady-state conditions. The curve in Figure 7 shows the maximum current which may be passed through the circuit at applied voltage levels between 0.2 v and 12 v without exceeding the dissipation rating of 12.5 watts for the two transistors in parallel.

Terminals A and B are connected to an external d-c ammeter. Some builders will prefer a self-contained ammeter. However, the EXTERNAL terminals allow the use of a multirange meter which is available for use elsewhere in the shop or laboratory when the electronic load resistor is not being used. Terminals C and D are for connection to the d-c supply under test. Observe carefully the polarity of these latter two terminals, otherwise the transistor collectors will be reverse-biased.

Since the transistors are bolted to the chassis directly for heat-sink purposes, the collectors are connected automatically to chassis, since the metal shells of the transistors are connected internally to the collectors.

Battery B consists of two 1½-volt, Size-D flashlight cells connected in series. The 22-ohm, 2-watt resistor, R_1, serves as a current-limiting resistor to protect the transistors from excessive input current when rheostat R_2 is set to zero resistance. Load (collector) current is maximum when R_2 is set to zero resistance; minimum when R_2 is at maximum resistance.

Switch S_1 permits quick connection or disconnection of the device when it is wired to the output of a d-c supply. Switch S_2 is used primarily to dis-

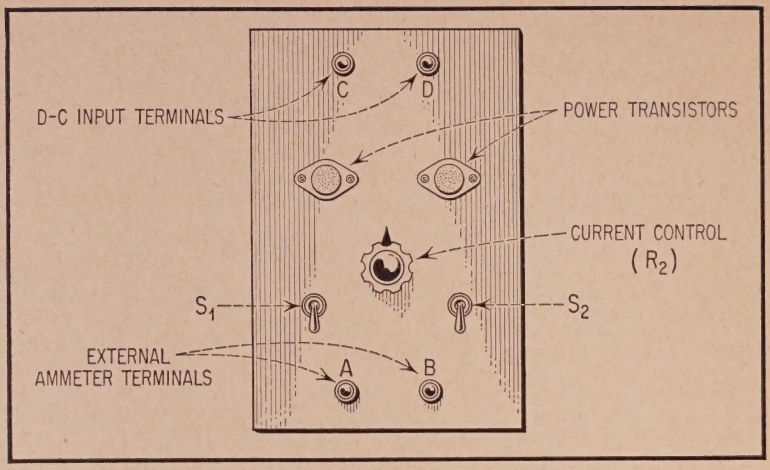

Fig. 8. Instrument Layout.

connect the battery, B, when the device is not in use.

The plot shown in Figure 7 is a 12.5-watt constant-dissipation curve for 25°C operation. The absolute maximum ratings of the Type 2N256 transistor call for a derating of 0.1 watt per °C for increases in ambient temperature above 25°C (77°F).

Construction

Figures 1 and 8 show constructional details of the transistorized electronic load resistor.

The Editors' instrument is built on a 9" x 5" x 2½" aluminum chassis. While this chassis might seem a little large for the purpose, it provides a good heat sink for conducting heat away from the transistors which are bolted to it.

Each transistor is bolted to the top of the chassis with a pair of 6-32 screws. A pair of 3/16"-diameter clearance holes, spaced 7/16 inch on centers, are provided for the base and emitter pins to pass through. The base and emitter leads (made of heavy, flexible, hookup wire) are soldered to pins 2 and 8 of wafer-type 9-pin miniature tube sockets and these sockets are employed as plugs, their holes 2 and 8 sliding neatly over the transistor pins.

All four terminals (A, B, C, and D) must be insulated from the chassis. Insulated binding posts having shoulder washers accordingly are used in this application.

The two flashlight cells of battery B are held under the chassis by straps made of 300-ohm antenna ribbon. One of the new battery holders might also be used for this purpose.

Extension of Range

Higher-current operation may be obtained by connecting more transistors in parallel or by employing higher-current, higher-dissipation transistors.

Higher-voltage operation may be obtained by employing power transistors having higher steady-state d-c collector voltage ratings.

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FOR SALE — Premier 570 RF signal gen., range 75 Kc to 150 Mc, separate audio signal output, A-1 cond. Sacrifice for $30 FOB NYC. Herbert Piller, 451 Thieriot Ave., Bronx 72, N. Y.

WANTED — Automatic record changer 3 speeds in portable carrying case, for large outdoor amplifier or can use good case. Cash or have items to swap. John Arnold, P.O.B. 84, Bluffs 3, Ill.

FOR SALE — Experimental flash lamp unit built to photgraph bullet flight. No flash lamp, includes components such as Variac, 2 mfd-4000 v. capacitors, etc. Asking $20. Will not ship. William H. Henshaw, 46 Front St., Tarrytown, N. Y.

WANTED — February 1956 issue of Audiocraft. Condition not important. Send price. R. F. Wisnom, 406 Glendale Rd., San Mateo, Calif.

FOR SALE — Lysco 25, w phone, 10 meter transmitter, mobile and Gonset 3-30 meg. converter. Both in very good condition. Make offer. Lowell R. Wilson, 5061 Emerson Ct. S/Dr., Indianapolis 18, Ind.

FOR SALE — QST's 1919-1935 with covers, 50c, without covers, 25c each; Riders 1-17 l. n. all for $50. Louis Steffan, 2232 W. 3d St., Williamsport, Pa.

FOR SALE — 300 Sams Photofacts and 10 binders; Riders TV 1. James J. Sullivan, 102 Swarthmore Ave., Folsom, Pa.

FOR SALE — Eico sig. gen. and VTVM. Local preferred. Archie A. Blakeslee, 251 Osborn St., Brooklyn 12, N. Y.

SELL OR TRADE — Hallicrafter 40A receiver, 4 bands, excellent condition, with record player connection; RCA 66X9 two bands, AM SW table model. Want Zenith transoceanic or other portable short wave receiver. R. Garcia, Universal, 44 8th Ave., New York, N. Y.

FOR SALE — Lettine 240 xmitter and antenna tuner with coils 80-10 meters, best offer over $50; SW-54 receiver, best offer over $20. Want DX-100 in very good condition. Patrick Crowley, R I Box 62, Oak Ridge, N. J.

WANT FOR CASH — Instruction manual for HRO50TI; coils; 50XCU. Have tubes and parts for trade. M. Marshall, 455 Washington Ave., Dumont, N. J.

WANTED — TRF Bandpass tuner. Prefer Miller EL-570. State price and details. W. B. Sigmon, 921 Garden St., Charleston, W. Va.

FOR SALE — Precise-116 tube tester assembled, $65, and kit, $45; Weston 695-power level indicator type 3A, $15. Want RCA WR-39C; TV calibrator. Will pay cash. Robert Schneider, 4126 N. Bernard Ave., Chicago 18, Ill.

FOR SALE — GE 160 portable radio, good condition, uses 2 v rechargeable battery, $15 less battery. FOB. Charles E. Berger, 28 Glenville Rd., Nixon, N. J.

TRADE — Commander, prismatic telescope 20 x 60 mm, coated lenses, perfect cond. (cost $95), for 3" or 5" Sylvania oscilloscope. M. E. Gaines, R. 1, Ft. Madison, Iowa.

SELL OR SWAP — 3 UHF converters: RCA, Mallory, Regency; 5 standard coil tuner strips for Heathkit C-3 condenser checker or Lafayette LC-15. Edward Sardiga, 230 N. 11th St., Belleville, Ill.

FOR SALE — Books: Automatic Record Changer Service manual 1947 — Sams; Principles Practice Radio Servicing — Hicks; Fundamentals Industrial Electronic Circuits — Richter; Introduction Industrial Electronics — Benedict; RCA and GE tube manuals; slide rule. Herbert Bernstein, 1689 St. Johns Pl., Brooklyn, N. Y.

FOR SALE — Hickok 505 oscilloscope, $55; Heathkit V-4A VTVM, $16. Pederson TV Radio, Walnut Grove, Minn.

WANTED — BC-375E, HT-17 Hallicrafters, transmitter, and other ham items for cash or trade tubes. D. R. Burkett, 2615 N. Orange Ave., Orlando, Fla.

WANTED — National NC100 receiver, prefer NC100XA, NC101XA, RBH, or similar; also National-made RBL. H. Foerster, 1321 E. 66th, Seattle 15, Wash.

SELL OR SWAP — UTC Linear Standard Hi-Fi transformers: LS21, LS24, LS52, HA106, perfect condition, for Knight wide-band oscilloscope. Kent Rosen, 5 Vermont Ave., White Plains, N. Y.

FOR SALE — DX-100 with converted one-control ant. loading, 1. n., $210. A. Taddeo, Water St., N. Pembroke, Mass.

WANTED — Schematic for Knight VTVM, has no model number. Leonard Pearson, R. 1, Tomah, Wis.

FOR SALE — 10-A multiphase exciter, with latest modifications, $95; signal slicer, model A, with AP-1 adapter, $45. Both like new. William J. Burda, 234 South Prospect Ave., Clarendon Hills, Ill.

FOR SALE — Heath SG-8, $17; QF-1, $7; AR3, $24; DX-35, $47; all custom wired, excellent condition. Need Heath PM-1, AM-1, IT-1; also BC-375E complete. L. Wright, Eagle Grove, Iowa.

FOR SALE — Simpson 485 signal generator in new condition, $325. FOB. All probes and manual. C. E. Corbin, R. 2, Box 313, Merced, Calif.

FOR SALE — Simpson 479 AM marker generator, crystal calibrator, FM generator, $225; Hickok 670 oscillograph, $100. Both perfect cond. with manuals. G. W. Aulabaugh, 1133 Wild St., Sycamore, Ill.

FOR SALE — UHF coils for standard coil tuners types F-Q-H, channel 21, $2 per set. Woodlawn Radio & Record Shop, Inc., 324 W. Woodlawn Ave., Louisville, Ky.

FOR SALE — 2 Channel Master Ultro Bow model 403 UHF antenna with screen reflector only $4.50; Vee-D-X Cornor reflector for UHF model COR-U $5. C. W. Lewis, 612 E. Wright St. Pensacola, Fla.

WANTED — Circuit diagrams for: Telrad 18A frequency standard mfd. by Garner Co., Chicago; and TS-7 Feiler Cathode-Ray Stethoscope mfd. by Feiler Engineering Co., Chicago. State price. A. Simek, 319 First Ave., New York 3, N. Y.

FOR SALE — Sears 30 watt amplifier, $15. Chester S. Collier, 190 Yoder St., South Bend 14, Ind.

SELL OR TRADE — Pyramid CRA-2 sig. gen.; Superior TV 30; Radio City scope M533; Jackson sweep and marker TVG-1; Win Tronix circuit analyzer; Central Electronix tube rej. RE1. Make offer. Earl's TV, 524 So. Western Ave., Dayton 7, Ohio

WANTED — Eico sig. gen. for cash any cond. J. Leach, Box 336 Milton, Del.

FOR SALE — Simpson 383 in-circuit capacitor leakage tester. $45. Need frequency measuring instrument and Conelrad alarm for receiver. Redd's Radio & TV Service, Box 12, Union Furnace, Ohio.

FOR SALE — Hallicrafters S-76 communications receiver with matching speaker, like new, $125. No trades. Bob McClain, Cullman, Ala.

WANTED — Movie sound projector. Will swap VTVM, signal tracer, VOM, scope and miscellaneous equipment. I. Tish, 1345 East 58 St., Brooklyn 34, N. Y.

FOR SALE — Riders vol. 11 thru 19; BC221 frequency meter, or trade for Hi-Fi equipment, tape recorder, good scope, or sweep generator. M. D. Haines, 1316 S. W. Military Dr., San Antonio 21, Texas

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FOR SALE — Heathkit TS-2 sweep gen., $20; Supreme audolyzer, $40; Heathkit scope 0-10, $70; Ferret 701 sig. gen., Riders 1-13, Telrad 18A freq. standard, $20 each; RCA 5 Mc scope WO-79A, $90. Allen, 3353 W. Irving Pk. Rd., Chicago 18, Ill.

FOR SALE — Coin operated blond Transvision 16" TV with preview automatic timer, rear of set and coinbox accessible only with keys, $65. M. J. Gatti, 1126 Hancock St., Brooklyn 21, N. Y.

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FOR SALE — Radio direction finder DAK-2 Federal Telephone & Radio Corp., with Goniometer and scope for instantaneous readings. 250-1500 Kc 60 cycle 115 v. Like new, $95. G. Helwege, 303 Hamilton Pl., Hackensack, N. J.

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FOR SALE — Collins plate xformer, multitap primary, commercial service ratings, 1100 v c.t. at .212 amps, $6. Want Heath TS-4 for cash. Norman Inventasch, 320 E. 176 St., New York 57, N. Y.

WANTED — Eico tube checker or equal for cash, any repairable cond. Samuel Scalco, Box 495, Scottdale, Pa.

FOR SALE — Kay Electric Co. Marka sweep RF-P, $75; Kay mega pix, $50; Precision ES500 scope, $75; Hickok 610A TV-FM sweep gen., $75; RCA WR 39A, $45; CRT tester, $20. Leonard E. Mumola, 180 8 Ave., New York 11, N. Y.

FOR SALE — W.E. type 10A double band pass TRF rcvr., for rack mounting. Make offer. York Marine Radio, Stonington, Conn.

FOR SALE — Radio & TV business: test equipment, amps, tape recorders for best offer. Write for details. Jack Fives, 2916 Rockrose Ave., Baltimore 15, Md.

FOR SALE — 6 v. to 110 v. converter for auto shaving, etc.; $6. Sprayberry Radio course with kits, $50. Want 6 v. to 12 v. battery eliminator, vibrator tester. W. Lamo, 2101 Adriatic, Long Beach 10, Calif.

SELL OR TRADE — Hallicrafters S-38C, $25; 304TL tubes, $7 each; 60 amp filament transformer for above, $3 fob; BC-224E, tubes & crystal, $40. Gene, 1001 Merritt, Old Hickory, Tenn.

WANTED — Control box for 8 wire rotor CDR model TR2. W. J. Novak, 719 Humphrey St., Ardmore, Pa.

TRADE — 2 Universal outdoor speakers 25 w. drivers; Sylvania classy chassis carrier; UHF converters and channel 40 strips. Interested in air-conditioner or small adding machine. Sealy, Box 317, Broderick, Calif.

FOR SALE — Mega sweep Jr. Mod. I, with instruction book. Mech. perfect cond. Steve Scott, 20133 Mackay, Detroit 34, Mich.

WANTED — Hallicrafters SX 42, SX 43 or SX 62. State price, condition. C. F. Albertoni, 2629 Paxton Ave., Akron 12, Ohio.

SELL OR TRADE — Wagner Elec. motor 110-220 VAC, ½ hp, 1725 rpm, 60 cycle, no perceptible wear, $15 FOB or what have you in radio gear, etc.? C. B. Kelley, 7204 Clovernook Ave., Cincinnati 31, Ohio.

WANTED — Dial glass for Model 39-116 Philco radio. French's Radio & TV, Box 676, Edgemont, So. Dak.

FOR SALE — Sams: Complete (TV only) schematics from 46 to 300. Make offer. Jacks Machine Shop, R-1, Lewisburg, Pa.

FOR SALE — Power gen. and regulator, rebuilt and guaranteed for 100 days: 40A unit $28.75, heavy duty 50A Police unit $77.32. Fred Haight, 9875 Ozga, Romulus, Mich.

TRADE — Unused BT-TV booster model HA-3, fully auto. for Regency TR-1 or TR-8 trans. rec. E. J. Levitzki, 259 8th St., Brooklyn, N. Y.

WANTED — Receivers AR-88, HRO, navy RAX 7-27 mc., ARR-5, APR-1 T.U. 40-100 mc., ARW-2 for cash or trade, BC-221, -348, -645; Motorola FM TR30D, Univ. 25 w. PA speaker, RCA 3" scope, etc. Joel Jones, 809 Cherry Dr., Jeffersonville, Ind.

FOR SALE — Precision E-200, $45; E-400, $79.50; Electronics design VT 100, $25; Simpson: 260 $35, 383 condenser chkr. $45; Hickok 533, $125. J. Pellock, 8643 Jennings, St. Louis, Mo.

WANTED — Model 260 GE portable radio; RS-38 microphone and bracket. Sell or trade Tele Tone portable TV, tubes, meters, 6 v. 54 Lincoln auto radio. M. S. Blemly, 23710 Samoset Trail, Birmingham. Mich.

WANTED — Jim-Lansing speaker, model 12" D131. Stanley Wellenc, 256 12th Ave., North Tonawanda, N. Y.

SELL OR TRADE — Presto Model Y professional 16" disc. recorder, wide range magnetic cutter and pickup, 78 and 331/3 rpm studio style amplifier and separate luggage type cases for $400 or 16 mm movie equipment. Mel Maillet, 5 Emerald St., Gardner, Mass.

WANTED — 50 watt and up, tuned cavaties and filters for 465 mc. Citizen's Bond, to fit 4X-150A's and GL3C29A's. Need 2 each. W. B. Hollis, 652 Cypress Ave., Sunnyvale, Calif.

WILL PAY — $2. for sale of, or permission to photostat, Instruction Manual and test tube charts for Model 500B or Model 500 tube tester. Manufactured by Precision Apparatus Co. about 15 years ago. Alan York, 35 Main St., East Hampton, N. Y.

SALE — Telrex 10 meter, 20 meter beams good cond., also Electrofab 15 meter beam. C. Storch, 5 Winfield Ter., Great Neck, L. L., N. Y.

FOR SALE — Teletype machine, very good cond., best offer. Robert De Haan, 1725 Kalamazoo Ave., Grand Rapids, Mich.

FOR SALE — Magnecord Stereophonic tape recorder; PT6-BN amplifier, PT6-BA2hZ deck, 2-speed hysteresis motor, 3¾", 7½", and 15" sec, new cond.; carrying cases, $600. D. J. Bonvallet, 742 Bellevue, Milford, Michigan.

FOR SALE — Astatic D-104 mike with stand; 2" Triplett meters; ham parts and tubes. Arnold Ely, 2484 Michigan Ave., Niagara Falls, N. Y.

FOR SALE — TCP GE tube checker, $50; CF-160 solar condenser analyzer, $72; Riders manuals 6 to 12, $7 each, 13 to 15, $12 each, vol. 8, $8. TV vol. 1, $15; Supreme scope, $180. All COD and in good cond. National Radio Service, 594 Larkin St. S.W., Apt 567, Atlanta 14, Ga.

FOR SALE — Wilcox-Gay recorder-radio; 8" TV Airline; BC 659 wih extra parts; BC 603 27 to 38 mc. Charles G. Hoffman, Box 186, North Terre Haute, Ind.

TRADE OR SWAP — Full set Wilson golf clubs and bag; 4 x 5 press camera in good cond.; VOM battery operated; condensor and resistor checker, good cond. Want tape recorder. Emory Corron, 4096 Redonda Lane, Dayton 6, Ohio

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FOR SALE — Gonset 10 m convertor, $10; Oak Ridge 104 syncro-sweep gen. & TV 103 sig. gen., both $40; RCA 1 & 2 & 3 Pictoguide; Syl. Pictoguide 1 & 2 $5; RCA color course 11 lessons plus extras, $10. S. Egelberg, 3029 Matthews Ave., Bronx 67, N. Y.

FOR SALE — Riders Manuals, 1 thru 6 good condition $23 plus shipping; 1924 Federal Tel. 61 BC receiver with 6 DL15 tubes; Radiola 26. Make offer. Alstead Radio Service, 603 Tyler St., Topeka, Kan.

WANTED FOR CASH — PE 75 gen. or similar, 110 or 220 volt and 2.5 to 5 kw. Joe Szabat, 16 Pearl Ave., Oil City, Pa.

SELL OR SWAP — Triplett 2413 tube checker with new roll chart; TS-4 Heath sweep generator for typewriter, adding machine or ? Woodrow McHargue, Princeton, Mo.

TRADE — Stancor 203 mobile xmitter, factory wired; Gonset 10-11 converter and noise clipper; PE 203A dynamotor, for Polaroid Land camera. Local preferred. Arthur Stauch, 541 Princeton Rd., Linden, N. J.

WANTED — VHF general aviation band receiver (108-130 mc.); Air-O-Ear 710-WN (made for house current use by Nova-Tech, Manhattan Beach, Calif.) or equivalent. State price and cond. M. Ferenc, 43 Hudson St., Garfield, N. J.

WANT — BC-610 transmitter in any cond. Ed Howell, 245 Rural Station, Dillon, S. C.

WANTED — Professsional motion picture cameras, accessories. Trade or sell professional recording equipment. Carl Nelson, 164-12 110th Rd., Jamaica 33, N. Y.

SELL OR TRADE — Eico 425 scope, Precision E 200 C sig. gen. for 35 mm or reflex camera. Fred Levitt, 224-15 135 Ave., Laurelton 13, N. Y.

WANTED — Tape recorder, or trade for electronic gear. Recorder need not be in working cond. L. R. Coy Kendall, 2203 Caroline, Wichita 12, Kan.

WANTED — Schematic circuit diagram and any instruction or service manual for the "Precedent" FM tuner manufactured by Radio Engineering Laboratories, Inc. B. G. Mahrenholz, 3014 E. Gum St., Evansville 14, Ind.

WANTED — Will pay good price for TS-323 made by Hoffman Radio. Bolton Laboratories Inc., Bolton, Mass.

FOR SALE — All Eico: 315 sig. gen. l. n., $35, 221 VTVM with h.v. and RF probes, $25, battery eliminator like new, $30. Ace Hi Electronics, 314 Bay 14 St., Brooklyn, N. Y.

FOR SALE — In perfect cond. National R-175 RFC, $2.60. Wallace Electronics, 2143 82 St., Brooklyn 14, N. Y.

FOR SALE — Perfect ARC-5 trans., $8; T85/APT5 radar trans. $20; UTC S47 transformer 3000 v. CT, $10; W.E. hearing aid, $10. Walter Zinsmeister, 146 N. 16th St., Bloomfield, N. J.

WANTED — Power transformer for 600 v. supply Temco 250 w. SCG xmitter. This is Kenyon S-17769, 740 v. AC with 220 v. primary. Solar transformer 721-015 will do the job. V. Barker, Woodside Dr., Freeport, Ill.

FOR SALE — Knight 50 w. CW xmitter, professional wiring, A-1 cond. John J. Oskay, 70 Senior St., New Brunswick, N. J.

WANTED — New industrial, special purpose, and transmitting tubes and transistors, any quantity,cash or trade. J. Klein, 9-20 166th St., Whitestone, N. Y.

WANTED — Used NC300 or SX101. Sell or trade RCA WV97A voltohymst VTVM; Delco motor A2400 1/8 hp, single phase, 60 cycle, 110 v. F. Van Newkirk, 654 Freeman St., Orange, N. J.

WANTED — All types of used test equip. in good cond. Have cash for late models sweep gen.; alignment gen.; sig. gen.; 20,000 ohm VOM. Wurms Radio-TV Service, 1015 W. Grant St., Appleton, Wis.

ANY OFFER — accepted for Riders Radio Manuals 2 to 16. Emanual Troise, 107-36 105th St., Ozone Park 17, N. Y.

WANTED — 5/8 D Greenlee chassis punch and key punch 1 21/64" for Amphenol S type sockets. Marvin Gurlin, 111 White Horse Pike, Audubon 6, N. J.

FOR SALE — Eico 425K scope, $35; Precise 630KA sig. gen., $44; Emerson 12" and Philco 10" TV chassis; all FOB New York. H. Bell, 3917 Ely Ave., New York 66, N. Y.

FOR SALE — Sprague KT-1 Kwik test (capactor tester), $15; Superior TV bar gen., $15; Sams vols. 2 and 10, $8 each. All items good cond. Willl ship postpaid. Arnold Vernoy, R. 2, Box 50, Monticello, N. Y.

WANTED — 2-way test equip. Such as Lampkin 105 freq. mtr.; 205 FM mod. mtr.; or measurements corp. model 80. Advise price and cond. W. Hughes, 1601 Mulberry St., Scranton 10, Penna.

FOR SALE — C.E. 20A and matching VFO, $200; Eldico SSB 1000, $350; 75A3, $310. No shipping. Geoge W. Moran, 8059 88th Ave., Woodhaven 21, N. Y.

FOR SALE — Weston 695 D.B. meter —12 to 46 plus, $10; Variac type C.M.H. 0 to 270 v., $15; United Choke LS-92, $10. R. Bronson, 252 Mateo Way, St. Petersburg 4, Fla.

TRADE OR SELL — SX-28; Riders manuals through 20; TV manuals 1 and 2 l. n. Albert Risner, Qtrs. 17125F, Camp Pendleton, Calif.

FOR SALE — 3½" relay rack panel and chassis (Apr. '56 Radio-TV News) unused. $2.60; Atwater-Kent model 46, $8; 400 v. TV pwr. supply with bias, less 2-5U4's, $10. Nelson Rau, 1509 Dewey Ave., Northampton, Pa.

SELL OR TRADE — Eico flyback tester, tube tester, sig. gen., 221 VTVM. Want Simpson 260 VOM, battery eliminator, Sams, Riders. E. D. Whaley, 109 Merriman St., Union, S. C.

SELL OR SWAP — Fisher 70 AZ 25 w. basic amplifier, l. n., $55; IBM oscilloscope-wobbulator 835, $45; Precise III Em & Gm tube checker, deluxe model, l. n., $75. Want Squarewave gen. M. Hauptmann, 581 Gramatan Ave., Mt. Vernon, N. Y.

SELL OR TRADE — Wire recorder mechanism with phono arm; Hewlitt-Packard audio oscillator (20 c.p.s. to 30 kc.); Precision E-200 sig. gen. Want hi-fi gear. I. Lefkowitz, 6 Circuit Rd., Bellport, L. I., N. Y.

FOR SALE — Hickok sig. gen.; field strength meter, other test equip. and parts for TV shop. Mrs. Paul Plummer, Box 495, Westfield, Pa.

FOR SALE — Ameco Jr. Code Course. Alphabet to 8 wpm., $3.50 F.O.B. New York. Harold Levy, 1585 East 172 St., New York 72, N. Y.

WANTED — For cash,RCA Victor 3-way portable, model 36QP. Made in Canada. John Marlboro, 148 Draper St., Dorchester 22, Mass.

FOR SALE — S-40A in good cond. for best offer above $50, with Heathkit Q-multiplier, $60; perfect S-38D, $35. Want SX-42 or equal. M. N . Parker, R. 1, Bunnell, Fla.

WANTED — Sams Photofacts in binders from 230 to date. Charles C. Hunt, P. O. Box 31, Calhoun, Ga.

WANTED — Operating instruction book for Hickok 610 sig. gen. Dan Schmittner Sr., 201 N. Woodward Ave., Wilmington 5, Del.

FOR SALE — Electronic design VTVM voltmeter; Simpson 215 VOM meter; V.M. automatic 3-way record changer; GE cartridge and base; local only. R. Kanasik, 1223 Elm Ave., Brooklyn, N. Y.

CASH — for Harman Kardon C-300 Hi-Fi amplifier. State cond. and price. Al Anderson, Box 154, Sedona, Ariz.

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meter coils, $24; Jackson 652 audio oscillator, 20-20,000 cy. l. n., $38. Paul DiSavino, Box 14, Towaco, N. J.

FOR SALE — GE TV chassis 840 &803 less CRT, good cond.; Telefunken 876 wk multiband receiver. Thomas Julian, 11 Gere Pl., Fanwood, N. J.

FOR SALE — Complete ARC-1 VHF 50 channel aircraft transceiver, $475; complete ART-13 transmitter, $525; ARC R-13B receiver, $150; ARN-6 $950; LM-5 freq. meter, 125Kc to 20Mc, original calibration book, AC supply, $75. Bill Slep, Box 178, Ellenton, Fla.

WANTED — GE sig. gen. YGS-3; McMurdo-Silver 911 sweep gen. or similiar. O. Zetlmeier, 1123 Woodycrest Ave., New York 52, N. Y.

FOR SALE — WE 105A main amplifier for studio speech input equip., 76 db gain, 30 or 600 in out 500 ohms, equipt with KS-7992 volume indicator meter and plate current meter. $25 FOB Pelham, N. Y. Emil Backstrom, Jr., 5235 N. Winthrop Ave., Chicago 40, Ill.

WANTED — 1 or 2 Motorola P8034 power supplies for FMR 13 v. receiver 110 v. AC, also Andrews ground plane antenna for 30-40 mc., and Shure Carbon Mics for Motorola equip. Laurel Z. Keene, 2542 Bellewood, Ann Arbor, Mich.

FOR SALE — 1925 Amborola radio made by American Bosch Magneto Corp., with instruction book, l. n.; 3 dial Freed-Eiseman Newtrodyne NR-5, Crosly XJ and others. Need original cabinet for 6 tube Philco AC model 65. Chester Wegrzynowski, 51 N. Central St., Buffalo 12, N. Y.

FOR SALE — Eico 147 signal tracer, $20 or trade for battery eliminator, or 1954 Ford radio. W. A. Duncan, 616 North Pine St., Ukiah, Calif.

WANTED — Mobile gear; schematic for surplus Bendix RA-1B aircraft communications receiver. Name price. Dean Matthews, 202 Fairway Dr., Huntsville, Ala.

FOR SALE — Rek-O-Kut Imperial disc recorder, extra lead screw, 45 RPM adaptor, stand, three sapphire stylii, $550 FOB Cleveland, Ohio. Suburban Recording Studio, 18716 Winslow Rd., Shaker Heights, Ohio.

FOR SALE — Two Shure 55S microphones, need light repair, $15 each. Harold Gabriel, 65-60 Wetherole St., Queens, Rego Park 74, N. Y.

FOR SALE — Motorola, RCA, Link FM mobile communications equip.; General Radio 804 sig. gen., 7-330 mc., $50. Want 30-50 and 120-172 mc. FM equip. David C. Hale, 5416 Eastridge Dr., Indianapolis 19, Ind.

FOR SALE — Radio City combination VTVM-CRT and vacuum tube tester and reactivator 808A plus H.V. probe A-1 cond, $50. Raymond McKay, 32052 Brush, Royal Oak, Mich.

WANTED — Recording head for Soundscriber PRA 4294, also use receiving head if price is right. R. D. Shellabarger, 717 Kentucky Ave., Signal Mtn., Tenn.

FOR SALE — Commercial Trades Institute Radio & Television course, 100 books, in good cond., $50, no kits. Stephen Mattushek, 202 Sixth St., Bridgeport 7, Conn.

WANTED — Television sig. gen. and marker gen. Frank J. Manno, 8243 S. Drexel Ave., Chicago 19, Ill.

FOR SALE — Heathkits: VTVM model-2, $15; grid dip meter GD-1A, $18; TV picture tube checker, $25; square and sine wave gen., $25; 0-6 scope, $28. A. Heshmati, 8809 Sylmar Ave., Panorama City, Calif.

FOR SALE — C-D 110R10 inverter, 110 v. DC to 110 v. AC, 100 w. cont. or 150 w. int. Like new. Trade for 2 meter gear, 12 v. DC to 115 v. AC inverter or cash. E. K. Harkness, 777 Bryant Ave., Winnetka, Ill.

FOR SALE — Heathkit T-3 signal tracer complete; Super Meter 670-A multimeter. Both for $40, local only. David Levinson, 30 W. 190 St., Bronx 68, N. Y.

FOR SALE — Hickok 195 scope in first class cond., $75. Roys Radio Servcie, 309 N. May St., Guymon, Okla.

TRADE — Used First National Radio and some TV course, pre-war; incomplete Army Radio Course of Midland Radio School for good 50 w. audio modulatiion transformer, or Hi-Fi output transformer. Frank's Radio Lab., Aledo, Ill.

FOR SALE — Best offer takes 3" Pilot TV with enlarger lens; Eico 803 geiger counter; Moto 409 autoset, used but perfect. J. J. Mueller, Manchester Depot, Vt.

WANTED — U.S. gold coins, any denomination. Will accept in trade for radio equip. Write for details. Ted Dames, 308 Hickory St., Arlington, N. J.

SELL OR TRADE — Hearing aid, old crystal set, sign painter letter patterns, TV color filters. Want transistors. John Haynes, Doe Run, Mo.

WANTED — Sprague tel-ohmike TO-4, any cond. Local. State price and cond. J. Kozma, 12450 NW 5 Ave., Miami 50, Fla.

WANTED — For cash standard brand tubes in original cartons. C. Frank TV Service, 6917 Dobson St., Niles 31, Ill.

WANTED — 6-12 v. DC supply for auto radio servicing; also 5 to 7" scope. Have tube tester to trade with Rollchart. Ben's Radio Service, Nash Rd., Sanborn, N. Y.

FOR SALE — Thordarson push-pull Hi-Fi output xformers T-65S94 and T-67S52. $10 for both. P. C. Robie, 559 Pleasant St., So. Weymouth 90, Mass.

FOR SALE — Professional type Hi-Fi tape recorder, Concertone 20/20 series, 7½ and 15 speeds, no cases, with manuals. Perfect $325 firm. R. Levine, 45 Satellite Lane, Levittown, N. Y.

SELL OR TRADE — Heathkit FM-3A tuner; Pilotuner T601; frequency Standard 18A, 10-100-1000 kc., self powered. Will swap for Heath communications receiver. Kenneth G. Davis, R. 4, Box 177, Annapolis, Md.

FOR SALE — Heathkit T3 sig. tracer, $17.50; Eico 147 sig. tracer factory wired, $25; Magnavox 12" EM speaker 580025, $5; power transformer for DuMont 2000 4251, $13; RCA 45 record player with amplifier, $17.50. W. G. Wright. 123 Putnam Ave., Freeport, N. Y.

WANTED — Collins receiver, 75A2 or 75A3 preferred. J. Taylor, Stanwood Rd., Mt. Kisco, N. Y.

FOR SALE — "Basic Electricity," Ed.-12, Sams 1955 — 257 pages, 8.5 x 11, spiral binding, mint cond. Postpaid $2.50. Frank York, 114-38 196 St., St. Albans 12, N. Y.

FOR SALE — Riders Radio 1-5 abridged; 4-11, 13-16 plus 21; Riders Record Changers and Recorders manual; Sams Record Changer Manual Vol 1 and 2. B. J. D'Adolf, 1877 McKinley Ave., East Meadow, N. Y.

FOR SALE — RCA 3" scope, mod. 155A, including instruction manual, $39.50. Wm. Levine, 216-69 68 Ave., Bayside 64, N. Y.

FOR SALE — Globe Trotter 50 w.; instructograph code machine, ten tapes. Morgan Jenkins, 35 Wayne St., Carbondale, Pa.

FOR SALE — Eico: 425 5" oscilloscope, 232 peak VTVM, 944 flyback tester, $78 with all probes; Heath C-3 condenser checker, $15. D. Marote, 159 Bonney St., New Bedford, Mass.

WANTED — Ampex or equivalent stereophonic tape player or player-recorder. State make, model no., cond., and price. R. Perry, 529 Garden St., Hoboken, N. J.

FOR SALE — 13 electronics books, plus 28 mostly late Sams folders in hard covers, $30. Value $89. Write for list. R. J. Lemos, 4 Briggs St., New Bedford, Mass.

SELL OR TRADE — 16" disc recorder-playback, with 70 new discs; 1-10A receiver. Interested in 2-mtr and aircraft gear, etc. Bob Townsley, 5919 Almaden, Oakland 11, Calif.

SALE — BC 412B oscilloscope; BC 1267A radio receiver & transmitter; RA 105A power supply; BC 1293B control unit; I-221-A indicator. Need ham gear. Gustave Mondrush, 600 Beechmont Dr., Dearborn 7, Mich.

FOR SALE — Eico: 322 sig. gen., 950 RC bridge, tubetester; Vibroplex Zephyr Bug, all in A-1 cond. Joseph Lynn, 1711 Morris Ave., New York 57, N. Y.

WANT — To correspond with others interested in miniaturized, transistor projects, pocket transmitters, receivers, wired wireless and wireless mikes. R. Lack, 2029 Bradley, Chicago 18, Ill.

WANTED — Radio control equip. xmitters, receiver-escapements, books on Radio control. Ed Tanrath, 2110 Broadway, Rockford, Ill.

WANTED — Books: 200 Meters and Down by Clinton DeSoto, G.E. Ham News Vol 1 bound (or loose issues-complete or single copies) and Gernsback's Educational Library Booklets 1, 4, 6, 7, 8, and 10. Name your price. M. Willimet, 713 Front St., (rear), Catasauqua, Pa.

FOR SALE — Mahogany cabinet with panel cutouts for tuner, preamp., amplifier, changer, VU meter, 16" turntable, misc. controls. Metropolitan only, $60. F. York, 114-38 196 St., St. Albans 12 N. Y.

FOR SALE — Regency transistor pocket radio, $20; Pickering D220 cartridge, $15; Johnson Viking VFO kit, $25. M. Bobbe, 275 East 168 St., Bronx 56, N. Y.

SELL OR TRADE — TS-4 Heath sweep gen. Used very little, $50 cash or trade for AT-1 xmitter or tape recorder. Woodrow McHargue, Princeton, Mo.

FOR SALE — Pickering arm 190-D, $24; Gonset 500 linear amplifier, $250; Hallicrafter SX42, $175. A. Dayes, 29 Charles St., Merrick, L. I., N. Y.

FOR SALE — NRI radio-TV-communictions course with up-to-date information. Cost $150, sell for $20. Herbert Piller, 451 Thieriot Ave., Bronx 72, N. Y.

FOR SALE —1957 printed circuit chassis AC-DC sets, less tubes, speakers and antenna, 5, 6, and $7 each; RCA TV chassis mode T-164, $5; All COD. V. Kozma, 12450 NW 5 Ave., Miami 50, Fla.

SWAP — 22 cal. Hi-Standard "Sentinel" 9 shot revolver, 3" barrel, good cond., $20 cash plus $15 worth of standard brand, unused, boxed tubes of my choice. C. Elgasser, 1920 Fern St., San Diego 2, Calif.

PARTS WANTED — Circular celluloid dial from Philco 655 or similiar Philco all wave receiver manufactured around 1939. Parts number may be 27-S165 or 27-5165. Dial scales read from top to bottom 6.0-18 mc., 1.8-5.8 mc., .55-1.70 mc. Alan York, 35 Main St., E. Hampton, N. Y.

WANTED — Course of Coyne TV and Radio lessons. C. H. Cross, 629 E. Center St., Seguin, Texas.

TRADE — Jensen H-222 coaxial hi-fi speaker, 1. n. Want BC-348 rcvr.; converted or not. Local preferred. Harry Teder, 6710 S. Claremont Ave., Chicago 36, Ill.

FOR SALE — Simpson 406 chromatic amplifier, $19. Langel's TV and Radio Service, 49 Warner St., Plains, Pa.

FOR SALE — Power transformer, tuner, cabinet, other parts for Philco 48-700 TV. Want good Simpson 260 VOM. Will pay cash. Kirk Lumsden, 1103 Arney St., Elizabethton, Tenn.

FOR SALE — Eico H.V. and R.F. probes; Bogen Hi-Fi amplifier; back issues of Service and Technician Magazines. Ralph Peterson, 5681 Clark Ave., Bethel Park, Pa.

SELL OR SWAP — Manuals for TG34A keyer and TG7-11 teletype printer. Need manuals for BC 348, BC 224, LM 13; blank LM 13 book. H. E. Decker, 1 Queens Court, Huntington 1. W. Va.

SELL — Radio-Electronics 1947 to present complete; Electronics 1953 to present. Best cash offer, trade for Hi-Fi equip. Alan Smith, 207 Eagle St., N. Adams, Mass.

FOR SALE — National NC-88 communications rcvr. in original carton; Zenith transoceanic portable, 3 years old, both perfect cond. Best offer. Havana TV and Radio Sales and Service, 325 East Main St., Havana, Ill.

SELL OR TRADE — Weston 777 tube tester; Heathkit 05 scope; Termans Principles of Elec. Eng.; Ghirardi's Modern Radio Servicing; Riders AFC books. Evans Radio, Ola, Ark.

FOR SALE — Radio and TV News from '48 to '56; Service and Service Management '54 to '57; Radio Electronics '49 to '53. Best offer. Williamson Radio Service, 631 W. Dallas Ave., Cooper, Tex.

FOR SALE — Eico 425 pushpull scope, $35. Alfred G. Bevers, 129 Woodlawn Ave., Yonkers 4, N. Y.

FOR SALE — Antennna coils, final plug in coils, link coils. All Bud, large sizes and sets, perfect cond. C. Storch, 5 Winfield Ter., Great Neck, L. I., N. Y.

TRADE — DB-22A preselector; Viking VFO kit (wired), and B & W low-pass filter for National HFS or Hallicrafters S-72 rcvr. Sell or trade VFO alone. Thurber, 247 Hamilton Rd., West Englewood, N. J.

WANTED — Good slide rule, RAX 3, BC 453, S21 in trade for new tubes and parts. Have GO-9 unmodified, best offer. A. Fagans, 158 Jefferson Ave., Rahway, N. J.

FOR SALE — Hallicrafters SX-17 rcvr. in fair cond., $40; RME HF 10-20 10/15/20 meter converter, in excellent cond., $45. Both for $75. FOB. Tom Lopez, 9224 Foster Ave., Brooklyn 36, N. Y.

FOR SALE — Back copies of Electronics, 1941 thru 1953, over 150 issues. Best offer. R. Mefford, Box 178, Burlington, Iowa.

SELL OR SWAP — Wilcox-Gay tape recorder, $25 plus shipping; Vibroplex bug; 4-805 xmitter tubes. F. L. Martini, 306 S. Buchanan, Edwardsville, Ill.

WANTED — Schematic and assembling drawings for Heath VTVM V-4A. Charles A. Zapf, 1444 Patapsco St., Baltimore 30, Md.

SWAP — Write for list of equip. for swap for 465 mobile xceiver. A. Spatz, 808 59th St., Brooklyn 20, N. Y.

FOR SALE — Hickok 610 A and 191 X sig. generators. Good cond., $250. Alvaradio Sales and Service, 2 Alvarado Ave., Worcester 4, Mass.

FOR SALE — 10-meter beam, 4 element of ½", poly insul., $25; voice amplifier; SCTPM-4, less batteries, $25; speech amplifier, 10 w., 110 VAC, $12; Super-Pro rcvr, BC 779A with power supply, $150. Want: BC 348, 221 and 312. Al Livingstone, 12-01 Ellis Ave., Fair Lawn, N. J.

FOR SALE — Hallicrafters S-38D rcvr., 6 months old, excellent cond. Best offer. Mike Vinocur, 1776 E. 13 St., Brooklyn, N. Y.

WANTED — High voltage probe for Eico 221 VTVM; TV picture tube test adapter for Eico 625, condenser and resistance substitution boxes, or condenser checker. C. A. Lougee, Box 44, Francestown, N. H.

FOR SALE — Good DX-35 and VF-1, $70; Heath Q-multiplier, $8; Jackson 640 test osc.; Turner 33(D) mike, $10. H. F. Berkshire, Lanark, Ill.

FOR SALE — Eico 425 push pull scope, l. n., $35. Victor F. Johnson, 823 N. Pulaski Rd., Chicago 51, Ill.

FOR SALE — DC-AC inverter, ATR model 6T-HSH used ½ hour cost $119.50, sell for $60. Henry Olsen, 901 So. 31 St., Lincoln, Neb.

CASH — for factory wired Precision gen. series E-200, must be in good working cond. O. R. Oligis, 918 E. Elm, El Dorado, Ark.

WANTED — 12WPA4 picture tube. Donald Carothers, R. 5, Columbus, Ind.

WANTED — For cash, set of Sams Photofacts in good cond. from approx. 100 to 350. Garvis McKeen, 109 Mallory Dr., LaGrange, Ga.

FOR SALE — RCA 12" loudspeaker, good in baffle box 19 x 27¾ x 11½ covered with oak contact paper, wrought iron legs, $15. S. Colow, 35-03 12th St., Long Island City 6, N. Y.

FOR SALE — Home built power supply, has unusual features. Will swap Eico 322 sig. gen., etc. Interested in meters only. S. J. Lo Nigro, 14 Madeline Ave., Clifton, N. J.

FOR SALE — RCA TV camera type ATJ. Best offer. E. Cantelon, 1910 Long Point Dr., Pontiac, Mich.

FOR SALE — Mallory 300 v. -100 MA 6 v. DC input vibrapack, $7. R. Schilling, 9 Zeliff Ave., Little Falls, N. J.

WANTED — Hallicrafters S-20-R or National NC-57. Must be good. James Widener, Box 3142, Kingsport, Tenn.

FOR SALE — Silver sweep 911 gen., $25; Radio City 701 RF gen., $10; Knight Y 119 capacitor checker, $12; Alliance Antenna booster AB2, $10; the lot, $50 fob. Stevens Radio Shop, Raymond, N. H.

WANTED — Sams Photofacts, communication receiver SX 25-28, in trade for Argus C-3, flash, 5 filters, F 3.5 Tele-Hagan telescopic lens, Sekonic L II Universal exposure meter. Roy A. Brown, C.S.C., U.S.N., Building 1908, U.S. Naval Station, Newport, R. I.

FOR SALE — Gonset tri-band converter, A-1 cond., $30 and noise clipper, $5; Walkie-Talkie BC-611-F (75 meters) less batteries and crystals, $50 or best offer. Want Johnson 6N2 and VHF 152-A converter. Harry E. Noyes, Box 791, Charlestown, N. H.

FOR SALE — BC-669D w/ pwr. supply, $175 FOB, 1 Kw, 3KV power supply components. F. C. Hervey, 813 E. Lindbergh St., Appleton, Wis.

SWAP — Books: Rider's Servicing by Resistance Measurements, Servicing Superheterdynes, FM Transmission Reception, Uslan Servicing by Signal Tracing, and Television Simplified by Kiver; also Superior CA-11 signal tracer — for books or test equipment. Martin Feldman, 265 Cabrini Blvd., New York 40, N. Y.

FOR SALE — Precision E400 sweep gen. 2 and 4.5 Mc. plug in crystals, terminating switch, leads and cables. $110 cash. G. T. Elam, 9800 Highcrest Ave., Valley Station, Ky.

FOR SALE — Crosley transistor radio; GE latest 3 way portable. P. Baker, 52 West 56th St., New York City 19, N. Y.

FOR SALE — Webster 331/3 rpm changer with base and crystal cartridge, good cond., and Webster 78 rpm changer, no base, $5 plus postage. Byron Kendis, 522 La Casa Ave., San Mateo, Calif.

FOR SALE — Matched pair BC-611 Handie Talkies on 3885 Kc. Less batteries $70; Pair 4X150A, $18; 51SB single side band gen. with adaptor for 32V series, $185. J. P. Keller, 514 Stevens Rd., Morrisville, Pa.

FOR SALE — Harvey-Wells 50 TBS xtal. mike 50D with power supply, $60; National 183 rack and panel rcvr., excellent cond., $140. J. T. Laird, 316 George St., Babylon, L. I., N. Y.

WANTED — AM and FM broadcast equp. AM transmitter to 1 kw. FM transmitter to 10 kw.; console limiter monitors; WE, GR, GE, RCA, Collins. Yolo Broadcasters, 724 X St., Apt. E, Sacramento, Calif.

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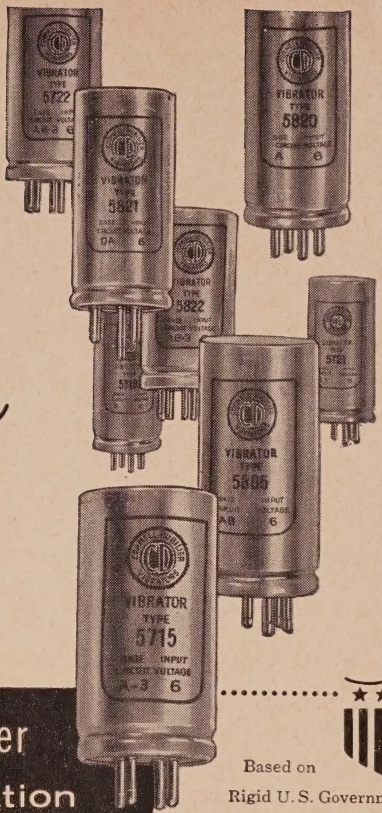

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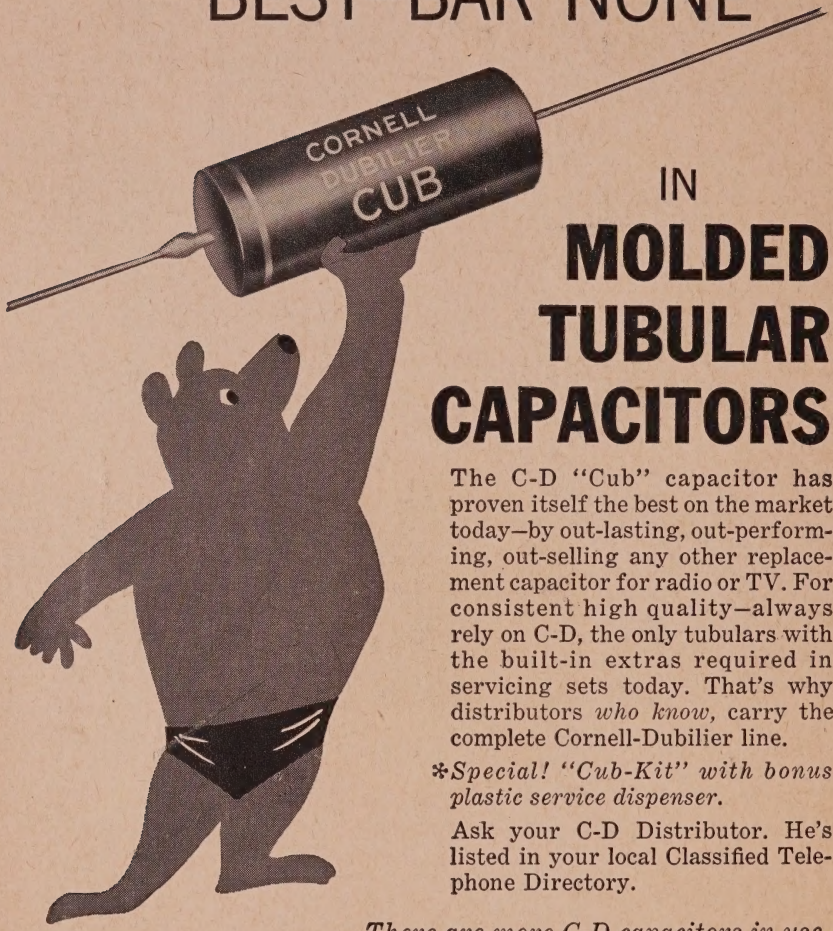

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